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10/649,286	08/26/2003	Frank Wegner Donnelly	5107-3-CIP	5481
22442	7590	12/06/2004	EXAMINER	
SHERIDAN ROSS PC 1560 BROADWAY SUITE 1200 DENVER, CO 80202			RO, BENTSU	
			ART UNIT	PAPER NUMBER
			2837	

DATE MAILED: 12/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/649,286

Applicant(s)

DONNELLY ET AL.

Examiner

Bentsu Ro

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22, 24, 25 and 27-37 is/are rejected.
- 7) ☒ Claim(s) 23 and 26 is/are objected to.
- 8) ☒ Claim(s) 1-37 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date various dates. (total 11 pages.)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

### FIRST OFFICE ACTION

1. In specification page 8, the description of Figure 16 should be split into Figure 16a and Figure 16b so that the description confirms with the drawings. The same correction is required for Figure 23.

2. Applicant should amend claim 7, line 2, by changing the phrase "a second different traction" to -- a second different traction motor--.

3. Drawing correction is required.

In Figs. 1-3 and 15, label the function of each box. For example, in Fig. 1, label box 1004 as "auxiliary system"; box 1003 as "primary energy storage system"; box 1001 as "logic unit"; etc. Applicants do not have to label the function of each reference numeral, such as 1061-1066. However, the function of a major component should be labeled. If the box is too small, the legend can be placed outside the box.

In Figs. 21-24, the characters (or words) inside each box are too small. Applicant should submit enlarged drawings so that the characters can be read easily.

The drawings as originally filed are informal. A new set of formal drawings is required now.

4. Applicant's first and second preliminary amendments filed 5/10/04 and 11/2/04 respectively will be entered in a due course.

The claims:	Bailey et al teaching:
<p>1. A locomotive, comprising:</p> <p>a plurality of direct current traction motors corresponding to a plurality of axles</p>	<p>Bailey et al do not show a locomotive in the drawings, however, in the text, Bailey repeatedly states "locomotive or transit car" (column 3, lines 20-22); "third rail" (column 3, line 24); "traction motor" (column 4, line 16); etc; thus, the traction motor of Bailey et al is in fact being used in a locomotive;</p> <p>Bailey Fig. 1 shows a dc traction motor 10; a locomotive has a plurality of axles, each axle is driven at least by one traction motor;</p> <p>alternatively, Smith's Fig. 2 shows a locomotive has a plurality of traction</p>

<p>and a plurality of drive switches; and</p> <p>a plurality of free-wheeling bypass circuits, each bypass circuit bypassing a corresponding one of plurality of drive switches.</p>	<p>motors 10-20;</p> <p>applicant should note that the examiner uses Smith's reference simply to show a plurality of traction motors in a locomotive; the Smith's reference is not used as a secondary reference to fill up the insufficiency of Bailey's reference;</p> <p>Fig. 3A shows a main thyristor 82 which is a drive switch; it is noted that for each motor 10, there is a main thyristor 82 to control the motor 10; because the locomotive has a plurality of motors, therefore, the locomotive also has a plurality of drive switches;</p> <p>Fig. 3A shows a free-wheeling diode 87 for bypassing the drive switch 82, thus, the free-wheeling diode 87 is a free-wheeling bypass circuit;</p> <p>again, a locomotive has a plurality of motors, therefore, there are a plurality of bypass free-wheeling bypass circuits, one for each motor.</p>
<p>2. (Currently Amended) The locomotive of claim 1, further comprising:</p> <p>a plurality of chopper circuits corresponding to the plurality of direct current traction motors,</p> <p>each chopper circuit comprising a respective free-wheeling bypass circuit and drive switch in electrical communication with a respective direct current traction motor.</p>	<p>the main thyristor 82 and the free-wheeling diode 87 together constitute a chopper circuits;</p> <p>because the locomotive has a plurality of traction motors, each motor has its own chopper circuit, therefore, there are plurality of chopper circuits;</p> <p>the chopper circuit includes main thyristor 82 and free-wheeling diode 87 in communication with the motor 10, see Fig. 3A.</p>

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<p>3. The locomotive of claim 2, wherein, in a first mode, at least most of the electrical current passing through the chopper circuit passes through the corresponding free-wheeling bypass circuit and the corresponding traction motor and bypasses the corresponding drive switch and,</p> <p>in a second mode, at least most of the electrical current passing through the chopper circuit passes through the corresponding drive switch and traction motor and bypasses the corresponding free-wheeling bypass circuit.</p>	<p>before explaining the limitation, applicant should compare his drawing Fig. 8 with Bailey's Fig. 3A in that, the corresponding elements and their arrangement are identical;</p> <p>applicant's Fig. 8 includes motor 8002, thyristor 8003, free-wheeling diode 8005 whereas Bailey Fig. 3A also includes motor 10, thyristor 82 and free-wheeling diode 87; the connection is also identical;</p> <p>the first mode reads onto the OFF-state of the thyristor 82; when thyristor 82 is off, the motor 10 functions as a generator, the current generates by the motor circulates through the free-wheeling diode 87; because the thyristor 82 is off, the current does not pass through the thyristor 82;</p> <p>the second mode reads onto the ON-state of the thyristor 82; when thyristor 82 is on, current passes from thyristor 82 to the motor 10, and bypassing the free-wheeling diode 87.</p>
<p>5. The locomotive of claim 1, wherein each free-wheeling bypass circuit comprises a free-wheeling gate.</p>	<p>the free-wheeling diode 87 is a free-wheeling gate.</p>
<p>6. The locomotive of claim 1, further comprising:</p> <p>a controller operable to</p> <p>(a) determine the power requirement for each motor at each of a number of successive time intervals;</p>	<p>Fig. 1 shows a controller;</p> <p>the Fig. 1 controller includes a voltage controller 38 (a PI amplifier) for compare the dc voltage Vd-c from the output of rectifier 24 with a reference</p>

<p>(b) determine the necessary voltage and pulse width to achieve the desired power for each motor; and</p> <p>(c) sequentially pulse power to each of the motors for a duration necessary to achieve the power requirement at each successive time interval.</p>	<p>voltage Vref to generate an error signal;  the error signal is fed to a comparator 36 to compare with a ramp generator signal 32;  this type of voltage control is to determine the power requirement of the motor because voltage control is a power control, i.e. (power) = (voltage) x (current), or <math>P=VI</math>;  the successive time intervals are the zero-crossing time intervals;  see column 4, line 15 to column 5, line 8;</p> <p>Fig. 1 shows a current control 28 and a current regulator 26, column 3, lines 46-68 describes motor output power control by varying the duty factor; thus, the duty factor is controlling (1) pulse width, and (2) the average voltage due to different pulse width;</p> <p>the current regulator 26 sequentially pulse power to the motor for a duration necessary to achieve the power requirement at each successive time interval.</p>
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Regarding claims 4, 7-9, 21 it is well known art that when two traction motors having different speed, then the higher speed motor should be temporarily switched off so that the second motor can catch up its speed. Claims 4, 7-9, 21 are claiming no more than such a situation.

Regarding claim 22, in most pulse width modulation, the frequency is kept constant. The motor current is controlled by varying the duty cycle. Bailey's Fig. 3A shows a current shunt 29 (a current sensor) for measuring motor current, the

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measured motor current is compared with a reference current (see Fig. 1). The motor current is controlled so that the motor current is consistent with the reference current.

The second group claims are method claims.

The subject matters of claims 10-17, 19, 20, 24, 25 are basically similar to that of the first group claims. For example, claim 10 sets forth the same limitation as that of claims 1-4; claim 11 sets forth the same limitation as that of claim 2; etc. , further discussion is deemed unnecessary.

Regarding claim 18, Bailey Fig. 3A shows a current control 28, which current control 28 is a device for over-current protection. Applicant should note that all current controls are over-current protection.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims (27-31) and (32-35) are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Johnson US Patent No. 6,012,011. (This reference is cited by applicant in the PTO-1449, submitted 12/17/2003.)

Johnson teaches the same subject matter as claimed, see the following comparison.

Claim 27. A method for addressing non-synchronous wheel slippage, comprising:	Johnson teaches a wheel slippage control, see the title;
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<p>providing a plurality of traction motors,</p> <p>each of the plurality of traction motors being independently coupled to and driving at least one wheel;</p> <p>detecting an operating characteristic of each of the plurality of traction motors;</p> <p>determining that at least one wheel corresponding to a first traction motor is experiencing wheel slippage; and</p> <p>in response to the determining step, reducing power supplied to the first traction motor for a selected period of time while continuing to provide power in excess of the reduced power to the remaining traction motors.</p>	<p>Fig. 1 shows a plurality of traction motors 80-83;</p> <p>see column 5, lines 9-11;</p> <p>the motor speed is detected by the rectifier assemblies 50-53, see column 5, lines 44-46;</p> <p>the adhesion loss detector (a monitoring system) determines the loss of traction of any one of the motors 80-83;</p> <p>see abstract and column 6, lines 16-26; it is noted that inhibit power to the motor is a type of "reducing power".</p>
<p>28. The method of claim 27, wherein the determining step comprises: determining that the operating characteristic of the first traction motor has a predetermined relationship with an operating characteristic setpoint.</p>	<p>the operating characteristic setpoint reads onto a motor threshold speed, see column 5, lines 49-58.</p>
<p>29. The method of claim 28, wherein the operating characteristic is at least one of a corresponding operating speed of each of the plurality of traction motors and .....</p> <p>comparing a detected operating characteristic detected for each of the traction motors to the operating characteristic setpoint and wherein, when the detected operating speed has the predetermined relationship with the</p>	<p>Johnson teaches the slowest motor speed or the average motor speed;</p> <p>in the first paragraph of claim 29, the operating characteristic is defined as either one of (1) motor speed or (2) motor current; Johnson teaches the motor speed;</p>

operating characteristic setpoint, the at least one wheel of the corresponding traction motor is determined to be experiencing wheel slippage.	with respect to the second paragraph of claim 29, Johnson teaches the wheel slippage determination based on the motor speed, see column 5, lines 44-60.
30. The method of claim 28, wherein the reducing step is performed until the detected operating characteristic for the first traction motor no longer has the predetermined relationship with the operating characteristic setpoint.	see column 6, lines 16-26.
31. A controller operable to perform the steps of claim 27.	Johnson teaches the same controller as explained in claim 27.

Claims 32-35 are system claims similar to the method claims 27-31, further explanation is unnecessary.

**Special note from the examiner:**

In the rejection, the examiner interprets the prohibit power to the motor is a step of "reducing power". Applicant may argue that prohibit power is not a "reducing power". If such a case, the examiner could (1) still maintain the same rejection because remove power is reducing power to zero, or (2) use a secondary reference, such as Hermansson et al US Patent No. 3,728,596.

9. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson as applied to claim 32 above, and further in view of Kumar US Patent No. 5,480,220.

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Regarding claim 37, Johnson does not teach a motor current as an operating characteristic, instead, Johnson teaches a motor speed as an operating characteristic.

However, using a motor current as an operating characteristic is taught by Kumar. Kumar Fig. 1 shows one current transducer 27 for each motor. The current is used for torque and slip control, see Fig. 2.

In view of Kumar's teaching, it would have been obvious to a skilled person in the art to use current transducer to detect a motor current for the wheel slip operating characteristic to achieve the same subject matter as claimed.

Then Why???

A current transducer is much easier to implement because current transducer is much simpler than a speed transducer.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 36 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 32 defines "a first traction motor is experiencing wheel slippage and, in response thereto, reduce a level of power supplied to the first traction motor for a selected period of time..."

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Claim 36 depends on claim 32 and further defines "to increase the level of power supplied to the first traction motor when the at least one wheel of the first traction motor has a detected operating speed in excess of the speed set point."

The subject matter of claims 32 and 36 is conflicting in that one sets forth "reducing power" whereas the other sets forth "increasing power".

11. Claims 23 and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

13. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number (571) 272-2072.

12/2/2004

Bentsu Ro  
Senior Examiner  
Art Unit 2837

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## RESTRICTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C.

121:

- I. Claims 1-26, drawn to locomotive motor power control with free-wheeling diode, classified in class 318, subclass 379.
- II. Claims 27-37, drawn to locomotive wheel slip control, classified in class 318, subclass 52.

The inventions are distinct, each from the other because of the following reasons:

Inventions free-wheeling diode and wheel slip control are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, inventions free-wheeling diode and slip control have separate utility such as a free-wheeling diode can be used with a relay coil and a wheel slip can be used with an automobile. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, and vice versa, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

**Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).**

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bentsu Ro whose telephone number is (571) 272-2072. The examiner can normally be reached on Mon-Fri, 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David S Martin can be reached on (571) 272-2107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Bentsu Ro  
Senior Examiner  
Art Unit 2837

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**EXAMINER'S COMMENT**

The examiner has examined all claims 1-37. However, because the claims are different, and time for search each group of claims are substantial, and the time given to the examiner is limited. Therefore, restriction is required.

The restriction/election give the examiner more time to concentrate on a specific group of claim search. As a result, the quality of examination would be enhanced, which is a benefit for both applicants and the examiner.

Bentsu Ro  
Senior examiner  
GAU 2837

A handwritten signature in black ink that reads "Bentsu Ro". The signature is written in a cursive, flowing style with a large initial "B" and a stylized "R".